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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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CONLEY ROSE, P.C.
P.O. BOX 684908
AUSTIN, TX 78768

EXAMINER	
QUASH, ANTHONY G	
ART UNIT	**PAPER NUMBER**
2881	

DATE MAILED: 10/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/882,818	NOTTE, JOHN A.	
	Examiner	Art Unit	
	Anthony Quash	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 July 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20,35 and 40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20,35 and 40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-12,19-20,35,40 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Oi [172] and in view of Oi [471]. As per claims 1,20,35,40, Oi [172] teaches a apparatus/method/system for inspecting a specimen comprising, a least one magnetic lens (see fig. 2) configured to apply a magnetic field to a charged particle beam (7) during use, wherein the magnetic lens (see fig. 2) is positioned along the path of the charged particle beam (7), and an apparatus configured to control a magnetic field strength generated by the magnetic lens during use, wherein the apparatus is connected to the magnetic lens and the system, the apparatus comprising a magnetic sensor (9) disposed within the magnetic field generated by the magnetic lens, wherein the sensor (9) is configured to generate an output signal during use, and wherein the output signal is responsive to a first magnetic field strength generated by the magnetic lens. See Oi [172] abstract, figs. 1-2, col. 1 lines 14-19, 29-31, 40-68, col. 2 lines 1-5, 18-68, and col. 3 lines 1-17. However, Oi [172] does not explicitly say, "a control circuit coupled to the magnetic sensor and the magnetic lens." This is however, shown an implied by Oi [172] in figs. 1-2, and col. 2 lines 20-51, wherein Oi [172] states, "... an output of the magnetic field detector 9 provided in the sample chamber is monitored.

The magnetic field generated by the objective lens of the electron beam lens barrel 2 is controlled by an electron beam lens barrel control system 4 so that the above value becomes a predetermined and memorized value ...." Oi [172] also states, "When focusing the electron beam 7, an excitation current value of the electron beam lens barrel 2 objective lens is controlled by the electron beam lens barrel 2 objective lens is controlled by the electron beam lens barrel control system 4 so that the value of the magnetic field detector 9 within the sample chamber becomes a previously measured and memorized value when under a focusing condition." See Oi [172] figs. 1-2, and col. 2 lines 28-44. Also see Oi [471] fig. 1. Oi [471] is listed here to illustrate/label the boxes 4, and 10 in figs. 1-2 of Oi [172] so to clarify any missing information/confusion about boxes 4 and 10 being controllers in the Oi [172] reference. Therefore, it is the examiner's view that Oi [172] does infer a control circuit (4,10) connected to the magnetic sensor (9) and the magnetic lens wherein the control circuit (4,10) is configured to receive the output signal from the magnetic sensor (9) during use, to receive an input signal responsive to a predetermined magnetic field strength during use, to generate a control signal responsive to the output signal and the input signal during use, and to apply a current to the magnetic lens, wherein the current is responsive to the control signal, based upon the previously listed passages in Oi [172].

3. As per claim 2, Oi [172] teaches the magnetic lens being configured to apply a magnetic field to a charged particle beam during use. See Oi [172] col. 2 lines 15-55.

4. As per claim 3, Oi [172] teaches the magnetic lens being connected to a scanning electron microscope. See Oi [172] figs. 1-2, col. 1 lines 14-25.

5. As per claim 4, Oi [172] and in view of Oi [471] teach all aspects of the claim except for the input signal comprising a voltage having a linear relationship to the predetermined magnetic field strength of the magnetic lens. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the input signal comprise a voltage having a linear relationship to the predetermined magnetic field strength of the magnetic lens in order to reduce the time need for adjusting the magnetic field strength of the lens.

6. As per claim 5, Oi [172] and in view of Oi [471] teach all aspects of the claim except for the output signal comprising a voltage having a linear relationship to the first magnetic field strength of the magnetic lens. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the output signal comprising a voltage having a linear relationship to the first magnetic field strength of the magnetic lens in order to reduce the time need for adjusting the magnetic field strength of the lens.

7. As per claim 6, Oi [172] teaches the control signal being responsive to a function of the output signal and the input signal. See Oi [172] col. 2 lines 25-68.

8. As per claim 7, Oi [172] teaches the control circuit (or equivalent thereof) being further configured to apply a current to at least one coil of the magnetic lens. See Oi [172] col. 2 lines 27-51.

9. As per claim 8, Oi [172] teaches the applied current being effective to generate a second magnetic field strength within the magnetic lens, and wherein the second magnetic field strength is closer to the predetermined magnetic field strength than the

first magnetic field strength. See Oi [172] col. 2 lines 25-51. The examiner interprets the second field to be the field produced by the magnetic lens as a response to a first reading of the magnetic field produced by the magnetic lens, and measured by the detector.

10. As per claim 9, Oi [172] teaches the applied current being effective to generate a second magnetic field strength within the magnetic lens, and wherein the second magnetic field strength is substantially the same as the predetermined magnetic field strength. See Oi [172] col. 2 lines 25-51. The examiner interprets the second field to be the field produced by the magnetic lens as a response to a first reading of the magnetic field produced by the magnetic lens, and measured by the detector.

11. As per claim 10, Oi [172] teaches all aspects of the claim except for explicitly stating the apparatus being further configured to continuously control the magnetic field strength of the magnetic lens during use. It would have been obvious to one of ordinary skill in the art to have the apparatus be further configured to continuously control the magnetic field strength of the magnetic lens during use in order to ensure the beam being focused at the proper setting at all times.

12. As per claim 11, Oi [172] teaches all aspects of the claim except for explicitly stating the apparatus being configured to intermittently control the magnetic field strength of the magnetic lens during use. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the apparatus configured to intermittently control the magnetic field strength of the magnetic lens during use in order to ensure the beam being focused at the proper setting at all times.

13. As per claim 12, Oi [172] teaches the magnetic sensor being disposed within a magnetic fringe field area of the magnetic lens. See Oi [172] col. 2 lines 28-42.

14. As per claim 19, Oi [172] in view of Oi [471] teach all aspects of the claim except for explicitly stating that the control circuit comprises an electronic current drive system configured to receive the control signal during use and to apply the current to the magnetic lens during use. Oi [172] does however teach control means for receiving and applying a current to the magnetic lens during use. See Oi [172] column 2. With respect to the applicants claiming that the control circuit comprises an electronic current drive system, it the examiner's view that this is inherent to the system described in Oi [172].

15. Claims 13-14 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Oi [172] and in view of Oi [471] as applied to claim 1 above, and further in view of Nomura [689]. As per claim 13, Oi [172] teaches all aspects of the claim except for explicitly stating the magnetic sensor being disposed within a cavity in the magnetic lens, and wherein the cavity is disposed between an outer pole piece of the magnetic lens and an inner pole piece of the magnetic lens. Nomura [689] does teach the magnetic sensor being disposed within a cavity in the magnetic lens, and wherein the cavity is disposed between an outer pole piece of the magnetic lens and an inner pole piece of the magnetic lens. See Nomura [689] col. 4 lines 45-55. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the magnetic sensor being disposed within a cavity in the magnetic lens, and wherein the cavity is disposed between an outer pole piece of the magnetic lens

and an inner pole piece of the magnetic lens in order to obtain a more precise/stronger reading of the magnetic field in order to adjust the magnetic field more precisely and therefore provide better focusing of the beam due to the magnetic field adjustments.

16. As per claim 14, Oi [172] in view of Oi [471] and further in view of Nomura [689] teach all aspects of the claim except for explicitly stating that the magnetic sensor be disposed within an inner pole piece of the magnetic lens. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have the magnetic sensor be disposed within an inner pole piece of the magnetic lens, since it has been held that rearranging parts of an invention involves only routine skill in the art.

17. Claims 15-16 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Oi [172] in view of Oi [471] and further in view of Gordon [071]. As per claim 15, Oi [172] in view of Oi [471] teach all aspects of the claims except for specifically stating the apparatus comprising a temperature sensor coupled to the magnetic lens, wherein the temperature sensor is configured to generate a temperature signal during use, and wherein the temperature signal is responsive to a temperature of the magnetic lens. Oi [172] does however teach that electron beam focusing is improved by reducing the effect of temperature drift in the objective lens. See Oi [172] col. 2 lines 1-5. In addition, Gordon [071] teaches a temperature sensor coupled to the magnetic lens, wherein the temperature sensor is configured to generate a temperature signal during use, and wherein the temperature signal is responsive to a temperature of the magnetic lens. See Gordon [071] abstract, fig. 1, col. 2 lines 44-57, col. 4 lines 45-62, col. 5 lines 60-68, col. 6 lines 1-5, 40-50, col. 7 lines 20-35. Therefore, it would have been obvious

to a person of ordinary skill in the art at the time the invention was made to have a temperature sensor coupled to the magnetic lens, wherein the temperature sensor is configured to generate a temperature signal during use, and wherein the temperature signal is responsive to a temperature of the magnetic lens in order aid in stabilizing the temperature of the magnetic lens and thereby stabilize the magnetic field strength due to the inverse dependence of magnetic field strength of the coils with respect to the temperature.

18. As per claim 16, Gordon [071] teaches the temperature sensor being further coupled to the magnetic sensor, wherein the magnetic sensor is further configured to receive the temperature signal during use and to generate an output signal during use, and wherein the output signal is further responsive to the temperature of the magnetic lens. See Gordon [071] abstract, fig. 1, col. 2 lines 44-57, col. 4 lines 45-62, col. 5 lines 60-68, col. 6 lines 1-5, 40-50, col. 7 lines 20-35.

19. Claims 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oi [172] in view of Oi [471] and further in view of Shintaku [808]. As per claim 17, Oi [172] in view of Oi [471] teach all aspects of the claim except for explicitly stating that the control circuit comprise a low-pass circuit element configured to receive the output signal during use and to reduce fluctuations in the output signal during use. Shintaku [808] does teach a control circuit comprising a low-pass circuit element configured to receive the output signal during use and to reduce fluctuations in the output signal during use. See Shintaku [808] fig. 8, col. 2 lines 5-20, and col. 5 lines 44-60. Therefore, it would have been obvious to a person of ordinary skill in the art at the time

the invention was made to have the control circuit comprise a low-pass circuit element configured to receive the output signal during use and to reduce fluctuations in the output signal during use in order to eliminate/reduce noise in the signal and therefore produce a more precise magnetic field, thereby enhancing the focusing ability of electron beam column.

20. As per claim 18, Shintaku [808] teaches the control circuit comprises an operational amplifier configured to generate a comparison signal during use, wherein the comparison signal is responsive to a comparison of the output signal and the input signal, and wherein the control signal is further responsive to a function of the comparison. See Shintaku [808] fig. 8, col. 2 lines 5-20, and col. 5 lines 44-60.

Response to Arguments

21. Applicant's arguments filed 7/13/04 have been fully considered but they are not persuasive. With respect to applicant's arguments concerning the Oi [6,452,172] reference not teaching both an output signal and an input signal received by control circuit and generating a control signal in response to both an output signal and an input signal, it is the examiner's view that Oi [6,452,172] does indeed teach this. This is made evident when Oi [6,452,172] states, "When using only a focused ion beam 6, an output of the magnetic field detector 9 provided in the sample chamber is monitored. The magnetic field generated by the objective lens of the electron beam lens barrel 2 is

controlled by an electron beam lens barrel control system 4 so that the above value becomes a predetermined and memorized value ...." See Oi [6,452,172] col. 2 lines 27-35. Oi [6,452,172] also goes on to state that, "When focusing the electron beam 7, an excitation current value of the electron beam lens barrel 2 objective lens is controlled by the electron beam lens barrel control system 4 so that the value of the magnetic field detector 9 within the sample chamber becomes a previously measured and memorized value when under a focused condition." See Oi [6,452,172] col. 2 lines 35-42. In addition, Oi [6,452,172] states that, "... the coils of the objective lens are formed by two coils capable of separately controlling the excitation current one of which is always excited by the constant excitation current and the other controls the magnetic field of both N->S and S->N polarities according to an output of the electric circuit." See Oi [6,452,172] col. 2 lines 45-50. These three passages clear indicated: (1) there is a predetermined magnetic field generated by one of the coils (as indicated by the coil always being excited) which is a result of an input signal being sent by the control circuit, (2) there is a magnetic field detector which measures the magnetic field in the chamber and sends a signal to the control circuit which sends a signal to the other coil which generates a magnetic field, and (3) the detector measures the magnetic field due to both and sends a signal to the control circuit which in turn sends an excitation current to the other coil (the coil that controls the magnetic field of both N->S and S->N polarities according to an output of the electric circuit) in order to maintain a desired magnetic field (which is implied by the claim 3 of Oi [6,452,172] when it states, "... and wherein coils of the objective lens comprise two coils separately controllable in

excitation current, one of which is always excited by a constant excitation current and the other of which controls a magnetic field of N->S and S->N polarities in response to signals received from an electric circuit."

Conclusion

22. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Quash whose telephone number is (571)-272-2480. The examiner can normally be reached on Monday thru Friday 9 a.m. to 5 p.m..

23. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on (571)-272-2477. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

24. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A. Quash

10/2/04

JOHN R. LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800